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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,145	08/26/2003	Gabriel Gallegos-Lopez	DP-309271	5047

22851 7590 04/21/2006  
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EXAMINER

MCCLOUD, RENATA D

ART UNIT PAPER NUMBER

2837

DATE MAILED: 04/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/649,145

Applicant(s)

GALLEGOS-LOPEZ ET AL.

Examiner

Renata McCloud

Art Unit

2837

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 14 and 16-18 is/are rejected.
- 7) ☒ Claim(s) 10-13 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08/26/03 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 08/26/03, 1/12/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the first clamp, third clamp, fourth clamp, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "66" and "80" have both been used to designate second clamp. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is

Art Unit: 2837

being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Pathway, first pathway, second pathway, third pathway, fourth pathway, fifth pathway, first clamp, third clamp, fourth clamp , tapping node, first tapping node, second tapping node, first summing node, second summing node.

### ***Claim Objections***

4. The claims are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 6,11,10,15 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They are replete with grammatical and idiomatic errors.

Claim 6 recites the limitation "the other one of". There is insufficient antecedent basis for this limitation in the claim.

Claims 7-8: it is unclear what or where the "pathways" are, especially since they are not described in the specification. It is unclear what or where the first clamp, third clamp, fourth clamp are especially since they are not described in the specification. It is unclear what the first summing node are second summing node are since there are more than one summing nodes described..

Claim 15: It is unclear what the integrator is responsive to. The limitation "at least one of is unclear". Is the integrator responsive to at least one of a (T0f), (T1+T2) or (Vmag); or is the integrator responsive to at least one of a (T0f), as in there are plural error signal feedbacks. It is unclear what is included in (i). Also the integrator is responsive to (i) and (ii), it is unclear what (ii) comprises. It appears to include all elements in lines 4-11. Also the claim could be read as the integrator being responsive to a third element (the maximum torque circuit, lines 7-9), and a fourth group (the summing circuit in lines 9-10). The claim is a run-on sentence full of grammatical errors causing the claim to be indefinite.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-7,16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Atarashi (US 20020113615).

**Claims 1,16:** a drive circuit (13) responsive to a direct voltage command signal and a quadrature voltage command signal, the drive circuit configured to produce said plurality of phase current signals for input to a permanent magnet machine (11; par. 0002); a current regulator including, a command circuit (22) responsive to a torque input command signal (fig. 1:\*T) configured to produce a direct current command signal and a quadrature current command signal (\*I<sub>q</sub>, \*I<sub>d</sub>); a control circuit (figs 1-2:23/ 31,32) responsive to the direct and quadrature current command signals configured to produce said direct and quadrature voltage command signals (Fig 2:vd, vq), and a limiter/clamp (33,34) configured to limit the direct and quadrature voltage command signals to a preselected level (par 0091, PI control limits the voltage).

**Claim 2:** the command circuit (22) includes a d-axis command circuit (24) responsive to a torque command (\*T) and a voltage magnitude (K<sub>e</sub>).

**Claim 3:** a transform circuit (fig. 2:38) responsive to the phase current signal and an angular position (Fig. 2:15; Fig. 3: 43) of the shaft to produce d-axis and q-axis feedback (par. 0083, 0096)

**Claim 4:** the command circuit (22) includes a q-axis current command circuit responsive to torque (\*T) and the current feedback (col. 4:20-25).

**Claim 5:** the control circuit (23) includes the limiter and a pair of clamps (33,34) limiting the q-axis and d-axis voltage (0091).

**Claim 6:** a d-axis command circuit (24) producing d-axis command ( $I_d$ ), a q-axis command circuit (25) producing q-axis command ( $I_q$ ), a d-axis control circuit (23/31/33) having a limiter (33) responsive to the dq-axis command, a q-axis control circuit (23/32/34) having a limiter (34).

**Claim 7:** the control circuit (23) having a first portion corresponding to said D-axis control circuit (31/33) and a second portion corresponding to said Q-axis control circuit (32/34), wherein said first portion includes a first proportional gain, a first integrator, and a first clamp (0091), and a first summing node (44) and a second clamp (53b), and wherein said second portion includes a second proportional gain (fig 17:K), a second integrator (fig 17:63b) and a third clamp (52), and a second summing node (46) and a fourth clamp (54a).

**Claim 17:** claim a pair of clamps limiting the q-axis and d-axis voltage (Fig. 2:33,34, the integral portion has two limits, an upper limit and a lower limit).

**Claim 18:** clamping the components of the q-axis and d-axis voltages (Fig. 2:33,34,  $V_q$ ,  $V_d$ , the integral portion has two limits, an upper limit and a lower limit).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2837

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Atarashi.

**Claim 9:** Atarashi teaches the limitations of claim 6. Referring to claim 9, they teach integrating the voltage. They do not teach the clamp limits. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the d-axis voltage clamp have a range of (-V and +V) in order to be able to integrate the voltage and since it is well known in the art that integration has a range from a negative limit to a positive limit.

12. Claims 7,9,14 rejected under 35 U.S.C. 103(a) as being unpatentable over Atarashi in view of Harakawa et al (US 6809492)

**Claim 7:** Atarashi teach a control circuit (23) having a first portion corresponding to said D-axis control circuit (31/33) and a second portion corresponding to said Q-axis control circuit (32/34), wherein said first portion includes a first proportional gain, a first integrator, and a first clamp (0091) and said second portion includes a second proportional gain, a second integrator and a third clamp (0091). They do not teach the first portion having a first summing node and a second clamp, and wherein said second portion includes a second summing node and a fourth clamp. Harakawa teach a d-axis control having first proportional gain (fig 17:K), a first integrator (fig 17:63b) and a clamp (52) a first summing node (44) and a second clamp (53b), and wherein a q-axis portion including a second proportional gain (fig 17:K), a second integrator (fig 17:63b) and a third clamp (52), and a second summing node (46) and a fourth clamp (54a). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus taught by Atarashi to include the summing nodes and clamps as taught by Harakawa et al in order to accurately control the voltage to a motor and since it is well known in the art that a PI controller comprises such components (see Harakawa col. 2:27-37).



**Claim 8:** Harakawa et al teach PI controllers for the D-axis and q-axis (Fig17).

**Claim 9:** Atarashi teaches the limitations of claim 6. Referring to claim 9, they teach integrating the voltage. They do not teach the clamp limits. Harakawa et al teach the d-axis voltage is between the ranges of the clamps (53b, + and - voltage). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus taught by Atarashi to use clamps as taught by Harakawa et al in order to accurately integrate the voltage.

**Claim 14:** Atarashi teaches the limitations of claim 1. Referring to claim 14, they do not teach producing an error current. Harakawa et al teach a d-axis current error signal (signal out from 44) and a q-axis current error signal (signal out from 46). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus taught by Atarashi to produce error signals as taught by Harakawa et al in order to control PI so that the current deviation goes to zero, thereby allowing accurate control of the voltage to a motor.

***Allowable Subject Matter***

13. Claims 10,11,15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Claims 12,13 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 2837

***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renata McCloud whose telephone number is (571) 272-2069. The examiner can normally be reached on Mon.- Fri. from 8 am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on (571) 272-2800 ext. 4. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Renata McCloud  
Examiner  
Art Unit 2837

rdm



MARLON J. FLETCHER  
PRIMARY EXAMINER